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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/056,609	01/24/2002	Ronald L. Pettyjohn	FORE-609	9506

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EXAMINER	
WALSH, JOHN B	
ART UNIT	PAPER NUMBER
2151	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/16/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/056,609	PETTYJOHN ET AL.	
	Examiner	Art Unit	
	John B. Walsh	2151	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *amdt of 1/25/07*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4 and 6-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4 and 6-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-4 and 6-8 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites "dividing the memory into a plurality of linear time-indexed arrays". It is unclear if the applicant is dividing the memory having the least two arrays, recited earlier in the claim, such that the memory now comprises at least four arrays or the applicant is dividing the plurality of locations of each array to include more locations or the limitation is merely a redundant recital of the memory having "at least two...arrays" recited earlier in the claim. Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1-4 and 7 as best understood are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5,940,397 to Gritton.

As concerns claim 1, a method of buffering at least one data unit received at a node on a communications network, the at least one data unit being associated with one or more channels in the network and having an associated timestamp value, the network node including at least one input port communicably coupleable to at least one output port, comprising the steps of: providing a memory (46) at each output port of the network node, the memory comprising at least two linear time-indexed arrays (figure 6a), each having a plurality of locations, at least one of the two linear time-indexed arrays for buffering (column 7, lines 30-40) the at least one data unit, each location having a variable to indicate whether a valid data unit is contained in the location (column 9, lines 38-45; column 8, line 64; column 5, line 15); in the event the at least one data unit is associated with a single channel in the network, storing the at least one data unit in a respective location of the time-indexed array based on the timestamp value (column 7, lines 30-50; column 7, line 54; column 12, lines 34-36); and in the event the at least one data unit is associated with a plurality of channels in the network, dividing the memory (42; column 11, line 1) into a plurality of linear time-indexed arrays, each time-indexed array corresponding to a respective channel, and storing the at least one data unit in a respective location of the corresponding time-indexed array based on the timestamp value (regardless of the number of channels, such that if there is one channel or a plurality of channels it will perform the functions; column 7, lines 30-50; column 7, line 54; column 12, lines 34-36).

As concerns claim 2, the method of claim 1 wherein the network node has predetermined total bandwidth (inherent for any particular device to have a physical limit for bandwidth;

column 3, lines 19-22), and the providing step includes providing a memory within the node, the memory having a size sufficient to support the total bandwidth of the node.

As concerns claim 3, the method of claim 1 wherein the dividing step includes dividing the memory into a plurality of arrays (arrays in memory; column 7, lines 23-24), each array corresponding to a respective channel (corresponds to data received over channels), the respective channels conforming to predetermined bandwidth requirements (inherent for any particular device to have a physical limit for bandwidth).

As concerns claim 4, the method of claim 3 wherein the dividing step includes dividing the memory into a plurality of arrays (arrays in memory; column 7, lines 23-24), each array having a size proportional to a fractional amount of a predetermined total bandwidth of the node (column 7, lines 38-40; inherent that the amount of data stored is proportional to the bandwidth).

As concerns claim 7, the method of claim 1 wherein the at least one data unit has an associated timestamp value, and the second storing step includes storing the at least one data unit in a respective location of the corresponding array based on the associated timestamp value (column 7, line 54; column 12, lines 34-36).

5. Claims 1-4 and 6-20 (claims 1-4 and 6-8 as best understood) are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 6,081,507 to Chao et al.

As concerns claim 1, a method of buffering at least one data unit received at a node on a communications network, the at least one data unit being associated with one or more channels in the network and having an associated timestamp value, the network node including at least one input port communicably coupleable to at least one output port, comprising the steps of: providing a memory (1600) at each output port of the network node, the memory comprising at

least two linear time-indexed arrays (column 18, lines 10-11) each having a plurality of locations, at least one of the two linear time-indexed arrays for buffering (column 18, lines 15-16; column 16, line 16) the at least one data unit, each location having a variable to indicate whether a valid data unit is contained in the location (column 17, line 1-validity bit); in the event the at least one data unit is associated with a single channel in the network, storing the at least one data unit in a respective location of the time-indexed array based on the associated timestamp value (column 15, lines 24-25; column 16, line 16); and in the event the at least one data unit is associated with a plurality of channels in the network, dividing the memory (column 13, lines 18-19) into a plurality of linear time-indexed arrays, each time-indexed array corresponding to a respective channel, and storing the at least one data unit in a respective location of the corresponding time-indexed array based on the associated timestamp value (regardless of the number of channels, such that if there is one channel or a plurality of channels it will perform the functions; column 16, line 16; column 18, lines 31-36; see also column 13, lines 16-30).

As concerns claim 2, the method of claim 1 wherein the network node has predetermined total bandwidth (inherent for any particular device to have a physical limit for bandwidth; column 13, line 15), and the providing step includes providing a memory within the node, the memory having a size sufficient to support the total bandwidth of the node.

As concerns claim 3, the method of claim 1 wherein the dividing step includes dividing the memory into a plurality of arrays (arrays in memory;), each array corresponding to a respective channel (corresponds to data received over channels; column 13, line 15), the

respective channels conforming to predetermined bandwidth requirements (inherent for any particular device to have a physical limit for bandwidth).

As concerns claim 4, the method of claim 3 wherein the dividing step includes dividing the memory into a plurality of arrays (arrays in memory; column 16, line 16), each array having a size proportional to a fractional amount of a predetermined total bandwidth of the node (inherent that the amount of data stored is proportional to the bandwidth).

As concerns claims 6 and 8, weighted-fair queuing algorithm (column 14, line 58).

As concerns claim 7, the method of claim 1 wherein the at least one data unit has an associated timestamp value, and the second storing step includes storing the at least one data unit in a respective location of the corresponding array based on the associated timestamp value (column 16, line 16).

As concerns claim 9, a method of scheduling the transmission of at least one data unit from a node on a communications network, the network node including at least one input port communicably coupleable to at least one output port, comprising the steps of: providing a first memory (1600) at each output port (column 8, line 21) of the network node, the first memory comprising at least two linear time-indexed array (column 18, lines 10-11) having a plurality of locations, at least one of the two linear time-indexed arrays for buffering the at least one data unit (column 18, lines 15-16; column 16, line 16); receiving at least one first data unit at the network node, the at least one first data unit having an associated timestamp value (column 16, line 16); inserting the first data unit into a respective location of the time-based array based on the associated timestamp value (column 18, line 16); indicating with a variable there is a valid data unit in the respective location (column 17, line 1-validity bit); partitioning a binary value of

the timestamp associated with the first data unit into a plurality of sub-fields, each sub-field comprising one or more bits, and using the plurality of sub-fields to generate a corresponding plurality of acceleration bit-strings for use in identifying the first data unit in the time-based array having a lowest associated timestamp value (figures 19A, 19B, 20A, 20B); extracting the identified first data unit having the lowest associated timestamp value from the time-based array (figures 19A, 19B, 20A, 20B); and designating the extracted first data unit as a next data unit to be transmitted over the network (figure 28; 2840).

As concerns claim 10, the method of claim 9 wherein the network node includes at least one second memory (1600; a second memory location or address) and the partitioning step includes using the sub-fields of bits to index respective locations in the at least one second memory and asserting values at the respective memory locations to generate the plurality of acceleration bit-strings.

As concerns claim 11, the method of claim 10 further including the step of priority encoding each acceleration bit-string to obtain a corresponding priority-encoded acceleration bit-string (figures 19A, 19B, 20A, 20B; column 17, lines 15-35).

As concerns claim 12, the method of claim 11 wherein the priority encoding step employs "low-wins" priority encoding (column 15, line 25).

As concerns claim 13, the method of claim 11 further including the step of employing one or more of the priority-encoded acceleration bit-strings to index the time-based array to identify the first data unit in the array having the lowest associated timestamp value (figures 19A, 19B, 20A, 20B; column 17, lines 15-35; column 18, lines 15-16).

As concerns claim 14, the method of claim 9 wherein each location of the time-based array corresponds to a respective timestamp value within a first time window ranging from t=0 to t=Tw, and further including the step of in the event the timestamp value associated with the next data unit to be transmitted over the network is greater than or equal to Tw/2, shifting the first time window forward in time by Tw/2 to obtain a next time window ranging from t=Tw/2 to t=3Tw/2 (column 15, lines 24-25; figures 34a, 34b).

As concerns claim 15, the method of claim 14 wherein the receiving step includes receiving at least one first data unit at the network node, the at least one first data unit having an associated timestamp value within a range limited to Tw/2 (column 15, lines 24-25; figures 34a, 34b).

As concerns claim 16, a system for scheduling the transmission of at least one data unit from a node on a communications network, the node including at least one input port and at least one output port, the input port being communicably coupleable to the output port, comprising: a first memory (1600) disposed at each output port of the network node, the first memory comprising at least two linear time-indexed array (column 18, lines 10-11) having a plurality of locations, at least one of the two linear time-indexed arrays configured to buffer at least one first data unit, each first data unit having an associated timestamp value (column 18, line 16); and a controller configured to insert the at least one first data unit into a respective location of the time-based array based on the associated timestamp value, partition a binary value of the timestamp associated with the first data unit into a plurality of sub-fields, each sub-field comprising one or more bits, use the plurality of sub-fields to generate a corresponding plurality of acceleration bit-strings for use in identifying the first data unit in the time-based

array having a lowest associated timestamp value, extract the identified first data unit having the lowest associated timestamp value from the time-based array, and designate the extracted first data unit as a next data unit to be transmitted over the network (figures 19A, 19B, 20A, 20B; figure 28; 2840).

As concerns claim 17, the system of claim 16 wherein each location of the time-based array corresponds to a respective timestamp value within a first time window ranging from t=0 to t=Tw, and the controller is further configured to, in the event the timestamp value associated with the next data unit to be transmitted over the network is greater than or equal to Tw/2, shift the first time window forward in time by Tw/2 to obtain a next time window ranging from t=Tw/2 to t=3Tw/2 (column 15, lines 24-25; figures 34a, 34b).

As concerns claim 18, the system of claim 16 wherein the network node has a predetermined total bandwidth and the time-based array has a size sufficient to support the total bandwidth of the node (over time it can support the total bandwidth).

As concerns claim 19, the system of claim 16 wherein the first memory comprises a plurality of linear time-indexed arrays, each array corresponding to a respective channel in the network (column 13, lines 18-19).

As concerns claim 20, the system of claim 19 wherein each array has a size proportional to a fractional amount of a predetermined total bandwidth of the network node (inherent that the amount of data stored is proportional to the bandwidth).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 6 and 8 as best understood are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,940,397 to Gritton as applied to claim 1 above, in view of U.S. Patent No. 6,081,507 to Chao et al.

Gritton '397 does not explicitly disclose a weighted-fair queuing algorithm.

Chao et al. '507 teach a weighted-fair queuing algorithm (column 14, line 58).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide Gritton '397 with a weighted-fair queuing algorithm, as taught by Chao et al. '507, in order to provide improved control and traffic management.

Response to Arguments

8. Applicant's arguments filed January 25, 2007 have been fully considered but they are not persuasive.

The Applicant argues Gritton does not teach or suggest "each location having a variable to indicate whether a valid data unit is contained in the location". The examiner disagrees since the claims are given the broadest reasonable interpretation and Gritton discloses this limitation at least at column 9, lines 38-45 ("...scheduler memory 64 can include one or more bitmaps that indicate the presence (e.g., logical "1") or lack thereof (e.g., logical "0") of an identifier...").

The Applicant argues Chao does not disclose "in the event the at least one data unit is associated with a plurality of channels in the network, dividing the memory into a plurality of linear time-indexed arrays." The limitation "in the event" implies a conditional statement and therefore is not limiting when the condition is not satisfied. The Applicant remarks "only forming the plurality of time-indexed arrays from the memory when the single data unit is associated with a plurality of channels and will appear in the network." This limitation is not explicitly recited in the claims. Furthermore the claims recite "at least two linear time indexed arrays" regardless of a single channel or a plurality of channels, therefore the claims do not recite or support the applicant's remark of "only forming..." since their appears that there is always formed a plurality of arrays to begin with.

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

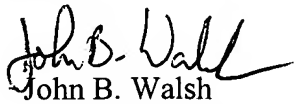
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to John B. Walsh whose telephone number is 571-272-7063. The examiner can normally be reached on Monday-Thursday from 7:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Zarni Maung can be reached on 571-272-3939. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



John B. Walsh
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